

Amendments of the Specification

Please replace the title with the following amended title:

METHOD AND SYSTEM FOR ACCELERATING RECEIPT OF DATA IN A CLIENT-TO-CLIENT NETWORK

Please replace the paragraph beginning at page 1, line 18 with the following amended paragraph:

The present invention relates to a method and system for accelerating receipt of data in a client-to-client network and, more particularly, to use of an acceleration server in proximity to user clients within the network to store previously received data.

Please replace the paragraph beginning at page 2, line 4 with the following amended paragraph:

Client-to-client networks (also referred to as peer-to-peer networks) have become popular in recent years (see for example www.napster.com). These networks provide members with software that allows them to transfer and receive data directly from other members across the Internet. Typically the transferred data is organized in large files which require significant amounts of time for transfer. The volume of transferred data in client-to-client networks is such that it can, in some cases, reduce available bandwidth within a network. This can cause undesirable slowdowns for other users.

Please replace the paragraph beginning at page 2, line 13, as previously amended, with the following amended paragraph:

There is thus a need for, and it would be highly advantageous to have, a method and system for accelerating receipt of data in a client-to-client network devoid of the above limitation.

Please replace the paragraph beginning at page 2, line 18 with the following amended paragraph:

According to one aspect of the present invention there is provided a method of accelerating receipt of data in a client_to_client network wherein each client in the client_to_client network operates a software program for implementing queries and providing responses. The method includes the steps of (a) intercepting queries and responses in the client_to_client network; (b) storing the intercepted queries and responses in an acceleration server; and (c) transmitting the intercepted responses to clients submitting intercepted queries.

Please replace the paragraph beginning at page 2, line 26 with the following amended paragraph:

According to another aspect of the present invention there is provided a system for accelerating receipt of data in a client_to_client network wherein each client in the client_to_client network operates a software program for implementing queries and providing responses. The system includes at least one acceleration server designed and configured to:

(a) intercept queries and responses in the client_to_client network wherein each of the queries and each of the responses contains unique identification information therein, the unique identification information facilitating interception thereof; (b) store the responses; and (c) transmit the responses to clients submitting intercepted queries. According to further features in preferred embodiments of the invention described below, step of intercepting is accomplished by a redirecting device.

Please replace the paragraph beginning at page 5, line 1 with the following two paragraphs:

According to still further features in the described preferred embodiments the acceleration server is located in a location selected from the group consisting of within a local

area network, on a server belonging to an Internet service provider, at a cable television provider junction, at a satellite relay link, and within an ADSL junction.

_____ According to still further features in the described preferred embodiments the step of transmitting a specific intercepted response to a client submitting a specific intercepted query occurs only if a specific client which served as a source of the specific intercepted response is available on the client-to-client network and only if the specific client contains data identical to the specific intercepted response in a directory of the specific client.

Please replace the paragraph beginning at page 5, line 12 with the following amended paragraph:

According to still further features in the described preferred embodiments the sub-step of transmitting a specific packet of the at least two packets to a client submitting a specific intercepted query occurs only if a specific client which served as a source of the specific intercepted response is available on the client-to-client network and only if the specific client contains data identical to the specific intercepted response in a directory of the specific client.

Please replace the paragraph beginning at page 5, line 19 with the following amended paragraph:

According to still further features in the described preferred embodiments the step of transmitting an intercepted response to a client submitting a specific intercepted query occurs only if a specific client which contains data equivalent to the specific intercepted response in a directory of the specific client is available on the client-to-client network. According to still further features in the described preferred embodiments the sub-step of transmitting a specific packet of the at least two packets to a client submitting a specific intercepted query occurs only if a specific client which contains data equivalent to the specific intercepted

response in a directory of the specific client is available on the client_to_client network.

Please replace the paragraph beginning at page 6, line 3 with the following amended paragraph:

According to still further features in the described preferred embodiments wherein the acceleration server further functions as a client in the client_to_client network.

Please replace the paragraph beginning at page 7, line 1 with the following amended paragraph:

The present invention successfully addresses the shortcomings of the presently known configurations by providing a method and system for accelerating receipt of data in a client_to_client network which can be easily implemented using commercially available hardware.

Please replace the paragraph beginning at page 7, line 26, as previously amended, with the following amended paragraph:

The present invention is of a method and system for accelerating receipt of data in a client_to_client network which can be advantageously employed to reduce traffic within a wide area network and increase bandwidth availability.

Please replace the paragraph beginning at page 8, line 1 with the following amended paragraph:

_____Specifically, the present invention can be used to store frequently requested data on servers along a data path, thereby shortening the path for a subsequent retrieval of the same data.

Please replace the paragraph beginning at page 8, line 4 with the following amended paragraph:

The principles and operation of a method and system for accelerating receipt of data in a client_to_client network according to the present invention may be better understood with reference to the drawings and accompanying descriptions.

Please replace the paragraph beginning at page 9, line 1 with the following amended paragraph:

For purposes of this specification and the accompanying claims, the term "server" refers to any computing machine capable of exchanging data with at least one other computing machine. A single server may comprise an individual computing machine or a plurality of such machines acting in concert to ~~perm~~ perform a function requested by at least one other computing machine.

Please replace the paragraph beginning at page 9, line 7 with the following amended paragraph:

For purposes of this specification and the accompanying claims, the term "WindowsTM" includes, but is not limited to, Windows_95TM, Windows 2000TM, Windows 3.xTM in which "x" is an integer such as "1", Windows NTTM, Windows 98TM, Windows CETM, Windows MillenniumTM and any upgraded versions of these operating systems by Microsoft Corp (USA) and/or window managers for the graphical X Windows system for UNIX-based operating systems and/or its variants such as Linux.

Please replace the paragraph beginning at page 9, line 20 with the following amended paragraph:

For purposes of this specification and the accompanying claims, the term "data" refers to digital data including, but not limited to, a software program, a text file, a sound file, a file containing at least one video image, and an animation sequence, as well as to any combinations thereof.

Please replace the paragraph beginning at page 9, line 24 with the following amended paragraph:

For purposes of this specification and the accompanying claims, the phrase "channel of communication" includes, but is not limited to, a telephone connection, a cellular telephone connection, an Internet connection, an

infrared frequency transmission connection, a local area network connection, a radio frequency connection, a fiber-optic connection or a connection by a wire. Inherent in the idea of a communication channel is an open status during which data transmission may occur. In some cases, communication channels may also have a closed status during which no data transmission may occur. The phrase is to be construed in its broadest possible sense so that it encompasses any mode of data transfer.

Please replace the paragraph beginning at page 10, line 5 with the following amended paragraph:

For purposes of this specification and the accompanying claims the phrase "software program" refers to any algorithm for performing at least one function on a computing device. The term specifically includes, but is not limited to, web browsers, music players, animation players, video players, games, compression algorithms, search programs, client-to-client interfaces and viewers.

Please replace the paragraph beginning at page 10, line 11 with the following amended paragraph:

For purposes of this specification and the accompanying claims the phrase "software program" refers to any algorithm for performing at least one function on a computing device. The term specifically includes, but is not limited to, web browsers, music players, animation players, video players, games, compression algorithms, search programs, client-to-client interfaces and viewers.

Please replace the paragraph beginning at page 10, line 15 with the following amended paragraph:

For purposes of this specification and the accompanying claims the phrase "display device" refers to any device for presentation of data to a user. The definition includes, but is not limited to, speakers, earphones, LCD

screens, LED displays, CRT displays and active matrix displays.

Please replace the paragraph beginning at page 10, line 20 with the following amended paragraph:

Referring now to the drawings, Figure 2 illustrates a method 20 of accelerating receipt of data in a client_to_client network. According to the present invention, data is typically received in response to a query. Each client 57 (Figure 1) in the client_to_client network operates a software program for implementing queries and providing responses. The software program may include, in some cases, at least two software programs. Typically the queries are requests for data and the responses are data. The data may be, for example, organized in a file type such as MP3, DVid, MPEG-2, MPEG-1, M-JPEG, MPEG-4, ActiveMovie/Video for Windows (.avi), QuickTime(.mov), RealVideo(.rm and .ram), H263.1, HTML, Flash, Gif, Tif, mpegguide, exe or any other file type.

Please replace the paragraph beginning at page 11, line 3 with the following amended paragraph:

Method 20 includes the step of intercepting 22 queries and responses in the client_to_client network. According some embodiments of the invention, the step of intercepting is accomplished by a redirecting device which may include, for example, a layer 4 switch.

Please replace the paragraph beginning at page 11, line 7 with the following amended paragraph:

Method 20 further includes the step of storing 24 the intercepted queries and responses in an acceleration server 52. Acceleration server 52 may be located, for example, within a local area network 54 (e.g. 57g and 57k) or in a server 60 belonging to an Internet Service Provider. In some cases, step of storing 24 is accomplished by use of an algorithm which may include analysis of, for example, temporal

information, ordinal information, frequency information, client information, identification information or combinations thereof. "Temporal information" as used herein may include, but is not limited to, data such as time of initial storage, total residence time in storage, elapsed time since last retrieval from storage, average time between retrievals from storage and time of creation of an original file. "Time" as used herein may include any reference to an absolute or relative measure of time including, but not limited to an absolute or elapsed time (e.g. 16:43:21 or 3hrs 21 minutes and 04 seconds since receipt) or an absolute or relative date (e.g. Feb. 22, 2001 or yesterday). "Ordinal information" as used herein refers to, for example, data such as order of receipt and order of retrieval. "Frequency information" as used herein refers to, for example, data such as frequency of retrieval and frequency of appearance in clients of the client_to_client network. "Client information" as used herein refers to, for example, data such as client connection status, client identification, and presence of specific data (i.e. a file or portion thereof) on a specific client. "Identification information" as used herein refers to, for example, data such as file identification, client identification, and identification of content within a file.

Please replace the paragraph beginning at page 12, line 5 with the following amended paragraph:

In some cases a single query or a single response may be intercepted by at least two acceleration servers. For example, a query for a video game called "piggy picnic" originates at client 57h in LAN 54a. The query is first intercepted by acceleration server 52 of client 57g. Because networks may reside one within another, although 57g is a client with respect to the client_to_client network, it (57g) includes server function within LAN 54a. In this case acceleration server 52 of client 57g is not storing a copy of

"piggy picnic" from a previous response, so the query is then relayed via ISP server 60 where the query is screened against stored responses in acceleration server 52 of server 60. Again, no match is found. The query is next relayed to user clients 57a, b, and c and to Internet 56. From Internet 56, the query is relayed to LAN 54b where it encounters acceleration server 52 of client 57k, and to Cable TV junction 62/Satellite relay 64 which contain an additional acceleration server 52. By these means, the query eventually reaches all of clients 57. At this point the query has been intercepted, and according to some embodiments stored, in a total of four acceleration servers 52. The result of the query is that copies of "piggy picnic" are present on clients 57a and 57m. This information is relayed to requesting client 57h via the same channels of communication described hereinabove. At this point client 57h requests to receive a copy of "piggy picnic" from client 57a. As this request is fulfilled, copies of "piggy picnic" may be stored on acceleration servers 52 of servers 60 and 57g. As a result, a subsequent request from client 57c for "piggy picnic" may be answered by transmitting the game directly from acceleration server 52 of server 60. Alternately or additionally a subsequent request from client 57f for "piggy picnic" may be answered by transmitting the game from acceleration server 52 of server 60 via Internet 56 and acceleration server 52 of satellite relay 64 to requesting client 57f. In this case, an additional copy of the game is generated at acceleration server 52 of satellite relay 64. In general, practice of method 20 causes copies of frequently requested data to accumulate in areas where the requests originate.

Please replace the paragraph beginning at page 13, line 7 with the following amended paragraph:

According to additional embodiments of the invention, the step of transmitting 26 a specific intercepted

response to a client submitting a specific intercepted query occurs only if a specific client which served as a source of the specific intercepted response is available on the client-to-client network and only if the specific client contains data identical to the specific intercepted response in a directory of the specific client. According to these embodiments, acceleration server 52 checks 36 if a specific intercepted response is available. If it is available, transmission occurs 26. If it is not available, no transmission occurs 40.

Please replace the paragraph beginning at page 13, line 16 with the following amended paragraph:

In some cases, requested data may be divided 28 into at least two packets before transmission. According to additional embodiments of the invention, the sub-step of transmitting a specific packet of the at least two packets to a client submitting a specific intercepted query occurs only if a specific client which served as a source of the specific intercepted response is available on the client-to-client network and only if the specific client contains data identical to the specific intercepted response in a directory of the specific client. That is, prior to transmitting a packet the network is checked 38 for the presence of that packet. If the packet is available, transmission occurs 26. If it is not available, no transmission occurs 40.

Please replace the paragraph beginning at page 13, line 26 with the following amended paragraph:

Alternately or additionally, the step of transmitting 26 an intercepted response to a client submitting a specific intercepted query occurs only if a specific client which contains data equivalent to the specific intercepted response in a directory of the specific client is available on the client-to-client network. If the equivalent data is available, transmission occurs 26. If it is not available, no

transmission occurs 40. The same principle may be applied to packets. If an equivalent packet is available, transmission occurs 26. If it is not available, no transmission occurs 40.

Please replace the paragraph beginning at page 14, line 5 with the following amended paragraph:

In some cases, the step of storing 24 the intercepted responses in an acceleration server may include storing 24 a single intercepted response which originates in at least two separate and distinct clients. For example, client 57a requests an ~~accapella~~ a cappella rendition of "Hatikva" by the Ramallah boys' choir as an MP3 file. The requested file is found on both clients 57b and 57c. The file is divided into ten packets, with packets 1,3,5,7 and 9 being sent to acceleration server 52 of server 60 by client 57b, and packets 2,4,6,8 and 10 being sent to acceleration server 52 of server 60 by client 57c.

Please replace the paragraph beginning at page 14, line 25 with the following amended paragraph:

According to another aspect of the present invention there is provided a system 50 for accelerating receipt of data in a client_to_client network wherein each client in the client_to_client network operates a software program for implementing queries and providing responses. The system includes at least one acceleration server 52 designed and configured to intercept queries and responses in the client_to_client network wherein each of the queries and each of the responses contains unique identification information therein, the unique identification information facilitating interception thereof. Acceleration server 52 is further designed and configured to store the responses. Acceleration server 52 is further designed and configured to transmit the responses to clients submitting intercepted queries. Limits may be placed on this transmission as described hereinabove and hereinbelow.

Please replace the paragraph beginning at page 16, line 1 with the following amended paragraph:

In some cases acceleration server 52 may further function as a client 57 in the client_to_client network. Alternately or additionally, acceleration server 52 may act as a transparent proxy server.

Please replace the paragraph beginning at page 16, line 20 with the following amended paragraph:

_____ All publications, patents and patent applications mentioned in this specification are herein incorporated in their entirety by reference into the specification, to the same extent as if each individual publication, patent or patent application was specifically and individually indicated to be incorporated herein by reference. In addition, citation or identification of any reference in this application shall not be construed as an admission that such reference is available as prior art to the present invention.

Please replace the abstract paragraph beginning at page 28, line 2 with the following amended abstract paragraph:

A method and system for accelerating receipt of data in a client_to_client network. The method includes the steps of intercepting queries and responses, storing the intercepted queries and responses in an acceleration server and transmitting the intercepted responses to clients submitting intercepted queries. The system includes at least one acceleration server designed and configured to perform the steps included in the method.